ABSTRACT

The invention is an air-conditioning unit 10 consisting of a housing 11 having at least one air inlet 21 for receiving air to be conditioned and at least one outlet 19 for discharging conditioned air, at least one fan 24 for moving air from the inlet 21 to the outlet 19, an air to air heat exchanger 26 of the type that cools the air by diverting and cooling a portion of the air through an evaporative cooling means, heat exchange occurring across a plurality of barriers 27 between the evaporatively cooled air and said incoming air, a vapour compression-type cooling system having an evaporator coil 54 through which the outlet stream of air passes for further cooling of the outlet air, a condenser coil 55 through which the evaporatively cooled air stream that exits the air to air heat exchanger 26 passes, and a control system 60 that at least determines the temperature of the room 12 air and controls the operation of the air-conditioner to operate only the air to air heat exchanger 26 when the temperature is maintained below a pre-determined level, and operates both said air to air heat exchanger 26 and the vapour compression-type cooling system when the temperature increases above a pre-determined level.

The advantage of the invention is that it has a seasonal power efficiency of two to three times greater by comparison to an air-conditioning system operating only with a vapour compression-type system.